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(54) PLASMA DISPLAY APPARATUS.

Abstract

Machine Translation

1 The present invention relates to the plasma display apparatus consisting of Y and Z sustain electrode line Y_1, Z_1, Y_2, Z_2, ... of M, Y_{M-1}, Z_{M-1}, Y_M, Z_M middle Y_{2a-1} and Y_{2a} (the below, A=1, 2, ..., the -1, and), with the altanative-current plasma display panel, with MICOM, with the memory unit, Y and Z sustain drive unit, and the address driver, and the manufacturing cost and power consumption are saved because the number of Y connected to the inter parallel and driving IC Z sustain electrode line each commonly runses and driving frequency are reduced. The EMI (Electromagnetic Interference) is reduced because Z sustain electrode line of M is divided and driven. And the life has many effect the scanning voltage of the sustain electrode line is reduced with the wall charge that at the same time, is formed on the sustain electrode line connected to the inter parallel, the power consumption is saved and the life is prolonged. As to the altanative-current plasma display panel, with MICOM, with the memory unit, Y and Z sustain drive unit, $Z_{2\beta}$ and $Z_{2\beta+1}$ (the below, β =1, 2, ..., the -2, and the -1) are parallely connected.

Representative Drawing

Fig. 5

Description

Brief explanation of the drawing

2 Fig. 1 is a block diagram showing one configuration among the plasma display apparatus by the prior art

3 Fig. 2 is a side sectional view of 1 a pixel among tri-electrode plasma display pannel (it says to be below, and the tri-electrode surface discharge PDP) illustrated in Fig. 1

4 Fig. 3 is a whole electrode structure diagram of the tri-electrode surface discharge PDP illustrated in Fig. 1

5 Fig. 4 is a whole electrode structure diagram of the tri-electrode surface discharge PDP equipped in the embodiment of the present invention

6 Fig. 5 is a block diagram showing the configuration of the plasma display apparatus by the embodiment of the present invention.

7 *The description of reference numerals of the main elements in drawings*

8 10: tri-electrode surface discharge PDP 20: MICOM.

9 30: memory unit 40: y sustain drive unit.

10 50: z sustain drive unit 61, 62: the first, and 2 address driver.

11 Y_1~Z_{480} : 480 Y and Z sustain electrode line.

12 R_1~B_{640} : 640 R (Red), G (Green), and B (Blue) address electrode line.

13 ITO-Y_1~ITO-Y_{240} : 240 Y common transparency electrodes.

14 ITO-Z_1 ~ITO-Z_{239} : 239 Z common transparency electrodes.

Details of the Invention

Purpose of the Invention

The technical field to which the invention belongs and the prior art in that filed

15 The present invention relates to the plasma display apparatus, particularly, to the plasma display apparatus including altanative-current plasma display panel (it says to be below, and the AC PDP) and indicates an image by the activating in low power consumption state on the AC PDP.

16 As to the present age, the significance of the display device increases according to the power generation and increase of supply of the information processing system as much as it is called as the information oriented society. The kind is gradually varied.

17 ***, as to the CRT (Cathode Ray Tube) most very much used as the display device, the size is large. The operating voltage is high. And research and development of all kinds of the lamellar panel display devices which are not suitable for the recent trend which has many problems it is generated to be twisted with display, etc and has the large-size of a screen, and a planarization as a goal and recently have the structure for matrix actively proceed.

18 It says to be the apparatus for indicating the moving picture or the still image by including plasma display panel (it says to be below, and PDP) which are the emission type element among the lamellar panel display device and using the gas electric discharge phenomenon of the PDP inside, the plasma display apparatus.

19 It is one configuration the same among the plasma display apparatus by the prior art like the next with Fig. 1 , and Fig. 2 referring to Fig. 3, if it illustrates.

20 In Fig. 1, the tri-electrode surface discharge PDP in which the full screen is comprised of the M×N pixel of the matrix type among the AC PDP as one is shown the reference numeral 10. It digitizes R (Red), which is input from an outside G (Green), and B (Blue) analog image data and it outputs R, G, and B digital image data and 120 shows MICOM outputting the various kinds control signal according to R/6, G, and B digital image data and external signal.

21 In the above case, the tri-electrode surface discharge PDP (10) is comprised of the front substrate (11), the backplane substrate (12) placing the front substrate (11) and prescribed distance in an interval and is parallelly positioned, the partition (13), Y of the partition (13) in the opposite side of the backplane substrate (12) among the front substrate (11) and M and Z sustain electrode line (Y_1, Z_1, Y_2, Z_2, ..., Y_{M-1}, Z_{M-1}, Y_M, Z_M) is by turns arranged and formed in order to meet at right angle, and the occasion in the discharge of each cell, the rust, R of the respective N it emits the visible light of the blue, G, and B fluorescent material layers (14a, 14b, 14c) it is parallelly formed on the backplane substrate (12) between each partition (13) with the partition (13) and it is formed on the backplane substrate (12) of the R, G, with B address electrode line (R_1, G_1, B_1, R_2, G_2, B_2, ..., R_{N-1}, G_{N-1}, B_{N-1}, R_N, G_N, B_N), discharge space inside of Y of M and N and partition (13) and R, G, and B address electrode line (R_1~B_N) causes a discharge with Z sustain electrode line (Y_1~Z_M). The front substrate (11) as shown in figs. 2 and figs. 2 is the display surface of an image. The partition (13) is arranged and formed between the front substrate (11) and backplane substrate (12) and forms the discharge space of 3N+1.

22 In the above case, R of Y of M and Z sustain electrode line (Y_1~Z_M) and N, G, and B address electrode line (R_1~B_N) are the member comprising M×N pixel (R, G, and B cell) of the matrix type. Z sustain electrode line (Z_1~Z_M) of M is altogether parallely connected.

23 Additionally, the dielectric layer (15) limiting the discharge current in the discharge of each cell is formed on Y and Z sustain electrode line (Y_1~Z_M) of M. The magnesium oxide (MgO) protective film (16) protecting Y of M and Z sustain electrode line (Y_1~Z_M) and dielectric layer (15) from the sputtering occurring on the dielectric layer (15) in the discharge of each cell is formed. And the discharge gas is injected inside the discharge space of each cell.

24 In Fig. 1, the memory unit storing R, outputted in the MICOM (120) G, and B digital image data to for each frame, the color sort, and a bitwise is shown the reference numeral 130. 140 shows Y sustain drive unit supplying the first drive pulse line corresponding to each to Y sustain electrode line (Y_1~Y_M) of M according to the control signal of the MICOM (120). And 150 shows Z sustain drive unit which commonly supplies the second driver pulse train to Z sustain electrode line (Z_1~Z_M) of M according to the control signal of the MICOM (120).

25 In the above case, Y sustain drive unit (140) is comprised of a plurality of driving ICs (Integrated Circuit) and the output pin of each driving IC is connected to the point-to-point mapping to Y sustain electrode line (Y_1~Y_M) of M. It is comprised of one driving IC and Z sustain drive unit (150) is connected to Z sustain electrode line (Z_1~Z_M) of M (the driving IC output pin of the total M has to be secured due to the independent driving of M Y sustain electrode line (Y_1~Y_M)). The middle 1 output pin is connected to the inter parallel.

26 In Fig. 1, the corresponding R/6 of Y of M and Y scanned among Z sustain electrode line (Y_1~Z_M) and N pixel (R, G, and B cell), which Z sustain electrode line comprises G, and B digital image data are input from the memory unit (130) and the reference numeral 161 and 162 show the first supplied R of N, G, and B address electrode line (R_1~B_N), and 2 address driver.

27 In the above case, the first address driver (161) supplies the corresponding R/6, G, and B digital image data to the address electrode line (R_1, B_1, G_2, ... R_{N-1}, B_{N-1}, G_N) positioned in an odd-number among R of N, G, and B address electrode line (R_1~B_N). It supplies the corresponding R/6, G, and B digital image data to the address electrode line (G_1, R_2, B_2, ... G_{N-1}, R_N, B_N) positioned in the even numbered turn and the second address driver (162) lowers the addressing frequency.

28 According to ADS subfield (Addressing and Display System sub-field) mode in which the plasma display apparatus by the prior art constructed as described above is one among various driving methods, if the process of indicating the image of 2^X gray scale on the tri-electrode surface discharge PDP is explained, the process is as follows:.

29 According to the gray scale for to implementing, addressing and display system sub-field method are the mode which divides 1 frame into a plurality of subfields and operated. It is classified into the reset period, the address period and sustain period and each subfield runs.

30 Here, as to the address period of each subfield, since being identically altogether allocated but the sustain period being differently allocated according to R, supplied through R of N, G, and B address electrode line (R_1~B_N) G, and the bit weight of B digital image data, the gray scale implementation of an image becomes possible to the combination (the storage effect of the eye is used) of each subfield.

31 For example, the sustain period of each subfield (SF_1~SF_X) is 2^0 1 frame is divided to the subfield (SF_1~SF_X) of X it is digitized by R, G, B analog image data is R of X bit, G, and B digital image data (lowest B_1 ~ highest B_X) for the implementation of 2^X gray scale: $2^1 : 2^2 : \ldots 2^{X-2}$: it is allocated to the rate of 2^{X-1}.

32 Firstly, the MICOM (120) outputs R of X bit, G, and B digital image data (B_1~B_X). It digitizes R, which is input from an outside G, and B analog image data and it outputs the various kinds control signal according to R/6, G, and B digital image data and external signal.

33 At this time, r, G , and B digital image data outputted in the MICOM (120) are stored in the memory unit (130) as for each frame, the color sort, and a bitwise.

34 Thereafter, supply Y sustain drive unit (140) and Z sustain drive unit (150) is the whole Y/6 according to the control signal of the MICOM (120) and the elimination (erase) pulse removing the wall charge generated to 1 step in the field of the previous in Z sustain electrode line (Y_1~Z_M), and Y sustain electrode line (Y_1~Y_M) of M with 4 step, successively, the scan pulse for forming the equal wall charge on the whole panel into 2 step of the fixed voltage the address discharge voltage of each cell which thereafter is performed is lowered the wall charge is formed in the respective formed R, G, and B fluorescent material layer (14a, 14b, 14c) surface on R of N, G, and B address electrode line (R_1~B_N) the erase pulse is supplied to the pulse, and 3 step it write (write)s to the address period of each subfield (SF_1~SF_X).

35 In 4 step, since while it Y sustain electrode line (Y_1~Y_M) of M is successively supplied with the scan pulse, the pulse voltage in which the scan pulse and polarity are an opposite is supplied to Z sustain electrode line (Z_1~Z_M) of M Y and Z sustain electrode line (Y_1~Z_M) of M are successively scanned with pair (Y and Z sustained pole line pair) sick.

36 Additionally, in 4 step, while Y and Z sustain electrode line (Y_1~Z_M) of M are successively Han SsangSsik scanned, the first , and 2 address drivers (161, 162) supply corresponding address pulse (R, G, and 1 bit value of B digital image data) synchronized in R of N, G, and B address electrode line (R_1~B_N) with the scan pulse and the address discharge occurs in the discharge space inside of each cell in which the logic high is supplied to the address pulse.

37 At this time, the first, and 2 address drivers (161, 162) supply $B_1 \rightarrow SF_1$, $B_2 \rightarrow SF_2$, ... $B_{X-1} \rightarrow SF_{X-1}$, $B_X \rightarrow SF_X$ among R of X bit, corresponding to each R/6, G, and B cell G, and B digital image data (B_1~B_X).

38 Moreover, in the discharge space inside of each cell, if the address discharge occurs, it is ionized and the electronics and ion and the discharge gas injected inside the discharge space consists of the plasma state. While falling down to the equilibrium state, particles excited in the plasma state with a collision emit the ultraviolet ray to each R/6, G, and B fluorescent material layer (14a, 14b, 14c). It is excited with the collision of the ultraviolet ray and each R/6, G , and B fluorescent material layers (14a, 14b, 14c) emit an enemy, the rust, and the blue visible light. And the rust , and the blue visible light come out to an outside through the front substrate (11).

39 In the meantime, if the address period of each subfield (SF_1~SF_X) is completed, it supplies the first, and 2 sustainer pulse to Y and Z sustain electrode line (Y_1~Z_M) of M according to the control signal of the MICOM (120) and Y and Z sustain drive units (140, 150) maintain each R/6, G, and a discharge and radiation of B cell for the period (sustain period) in which the first, and 2 sustainer pulse are supplied.

40 At this time, in each subfield (SF_1~SF_X), the sustainer pulse which is in proportion to the $SF_1 : SF_2 : \ldots SF_{X-1} : SF_X = 2^0 : 2^1 : \ldots 2^{X-2} : 2^{X-1}$ of a number is supplied.

41 It maintains for the period (sustain period) in which each R/6, which supplies the first which is in proportion of a number, and 2 sustainer pulse and in which the address discharge occurs G, the first the discharge of B cell and radiation, and 2 sustainer pulse are supplied.

42 The multilevel image of 1 frame is indicated on the tri-electrode surface discharge PDP (10) if the sustain period of the last subfield (SF_X) is completed after the process as described above.

43 But there is a problem that as to the plasma display apparatus by the prior art, a high power consumption is required because the scanning voltage and driving frequency of the sustain electrode line are high. The lifetime of the AC PDP is short and it is difficult to the put to practical use.

44 Additionally, conventionally, there is a problem that a current increases because all Z sustain electrode lines are connected to the inter parallel and the discharge current of each cell altogether goes to the same direction and the frequency increases and it turns against the EMI (Electromagnetic Interference).

45 Therefore, conventionally, there is a problem that the rise of manufacturing cost of the plasma display apparatus is caused because of the method for each independently runing a plurality of Z sustain electrode lines being applied but needing the in this case many driving IC.

46 Moreover, conventionally, there is a problem that the first, and 2 address driver divide the address electrode line positioned among a plurality of R, G, and B address electrode line with odd-number and the address electrode line positioned with even numbered turn and it runs but and the picture quality is lowered for this for the memory unit and the first address driver since the braided (cross talk) phenomenon of data transmission pattern is serious and many noise is generated in the display image because R, for altogether transmitting R, G, and B digital image data between the memory unit and the second address driver G, and B data transmission pattern have to be molded.

Technical challenges of the Invention

47 An object of the present invention is to provide the plasma display apparatus which is to solve problems described in the above worked out, and the scanning voltage and driving frequency are reduced by a part including the identical electrode line and the AC PDP parallely connected with the adjacent electrode line among a plurality of Y and Z sustain electrode line and commonly runing a part Y/6 and parallely connected Z sustain electrode line and, in which the power consumption is saved, and which is extended for the life.

48 Moreover, there can be and, the other purpose the plasma display apparatus in which a plurality of Z sustain electrode lines the number of driving IC a part adjacent electrode line is connected to the inter parallel and it commonly runses and EMI are reduced is provided it connects and it commonly runs as the present invention is the inter parallel a part adjacent electrode line among a plurality of Y sustain electrode lines.

49 Moreover, as to the present invention, the first address driver runs all R address electrode lines and odd-number G address electrode line among a plurality of R, G, and B address electrode line. Since the second address driver runs the rest even numbered turn G address electrode line and all B address electrode lines the entanglement formed between the memory unit and the first, and 2 address driver of data transmission pattern is reduced and it provides the plasma display apparatus in which the noise of the display image is reduced, it has and, the other purpose.

Structure & Operation of the Invention

50 MICOM in which to accomplish the above objects, the plasma display apparatus is made of Y and Z sustain electrode line Y_1, Z_1, Y_2, Z_2, ... of M, and the full screen is the M×N pixel of the matrix type it is arranged and formed in order to meet at right angle the R, G, B address electrode line R_1, G_1, B_1, R_2, G_2, B_2, ..., R_{N-1}, G_{N-1}, B_{N-1}, R_N, G_N, B_N Lee Sang Ho of N and Y_{M-1}, Z_{M-1}, Y_M, Z_M like above statement, and which digitizes altanative-current plasma display panel (it says to be below, and the AC PDP): in which Y_{2a-1} and Y_{2a} (the below, A=1, 2, ..., the -1, and), and $Z_{2\beta}$ and $Z_{2\beta+1}$ (the below, β =1, 2, ..., the -2, and the -1) are parallely connected among Y and Z sustain electrode line of M and analog image data which is input from an outside and outputting digital image data, and outputting the various kinds control signal according to digital image data and external signal. And MICOM are characterized that it is comprised of the memory unit, the scan pulse, supplied according to the control signal of MICOM to Y_1 more, Y_2 or Y sustain drive unit supplying to Y_M and successively scans Y sustain electrode line of M, and supplies the first sustainer pulse to Y sustain electrode line, Z sustain drive unit which successively scans Z sustain electrode line of M according to the control signal of MICOM and prevents the same time

scanning of Y_{2a} and Y_{2a-1}, and supplies the second sustainer pulse to Z sustain electrode line, and the address driver. The memory unit outputted digital image data is stored. As to the scan pulse, supplied, a scanning is completed. The scan pulse of the low power. As to Z sustain drive unit which successively scans Z sustain electrode line of M, a scanning is completed. As to the address driver, digital image data which Z sustain electrode line comprises of N pixel and Y scanned among Y and Z sustain electrode line of M is input from the memory unit and supplied R of N, G, and B address electrode line.

56 According to a preferred embodiment of the present invention, it is preferable that it includes Y common transparency electrode of the respective the AC PDP connects one end of Y_{2a-1} and Y_{2a}, and Z common transparency electrode of the respective -1 s it connects the other end of $Z_{2\beta}$ and $Z_{2\beta+1}$.

57 Moreover, it is preferable that the address driver is comprised of R of N, G, all R address electrode lines among B address electrode line and odd-number G address electrode line R_1, G_1, R_2, ..., the first address driver supplying corresponding digital image data to R_{N-1}, G_{N-1}, R_N, and the second address driver supplying corresponding digital image data to the even numbered turn G address electrode line and all B address electrode line B_1, G_2, B_2, ...s, and B_{N-1}, G_N, B_N.

58 Referring to the figure concretely, it illustrates.

59 Additionally, in all drawings for illustrating the preferred embodiment of the present invention, the member doing the same function as the prior art described as the same denotation as the prior art. The repeted comment about each omitted.

60 The plasma display apparatus by the embodiment of the present invention is made of as shown in figs. 4 and figs. 4 R of Y of 480 and Z sustain electrode line (Y_1, Z_1, Y_2, Z_2, ..., Y_{479}, Z_{479}, Y_{480}, Z_{480}) and 640, G, and the full screen is 480×640 the pixel of the matrix type B address electrode line (R_1, G_1, B_1, R_2, G_2, B_2, ..., R_{639}, G_{639}, B_{639}, R_{640}, G_{640}, B_{640}) is arranged and formed in order to meet at right angle the reciprocity it digitizes the tri-electrode surface discharge PDP (10): in which $Z_{2\beta}$ and $Z_{2\beta+1}$ (the below, β =1, 2, ..., 238, and 239) are parallely connected among Z sustain electrode line (Z_1, Z_2, ..., Z_{479}, Z_{480}) of 480 and R, which is input from an outside G, and B analog image data and it successively scans Z sustain electrode line (Z_1 ~ Z_{480}) of 480 according to the control signal of the MICOM (20) and Y sustain drive unit (40): supplying the first sustainer pulse to Y sustain electrode line in which a scanning is completed and it prevents the same time scanning of Y_{2a} and Y_{2a-1}. It is comprised of Z sustain drive unit (50) supplying the second sustainer pulse to Z sustain electrode line, and the address driver supplied R of 640, G, and B address electrode line (R_1 ~ B_{640}) R. As to Z sustain drive unit (50), a scanning is completed. The address driver supplied R of 640, G, and B address electrode line (R_1 ~ B_{640}) R Z sustain electrode line comprises of Y of 480 and Y scanned among Z sustain electrode line (Y_1 ~Z_{480}) and 640 a pixel, G, and B digital image data are input from the memory unit (30).

66 Moreover, it is comprised of Y common transparency electrode (ITO-Y_1, ITO-Y_2, ..., ITO-Y_{239}, ITO-Y_{240}) of the respective 240 it connects one end of Y_{2a-1} among Y sustain electrode line (Y_1 ~Y_{480}) of 480 in the tri-electrode surface discharge PDP (10) and Y_{2a}, the address driver is R of 640, G, and all R address electrode lines among B address electrode line (R_1 ~B_{640}) and the first address driver (61) supplying the corresponding R/6, and G digital image data to the odd-number G address electrode line (R_1, G_1, R_2, ..., R_{639}, G_{639}, R_{640}) Z common transparency electrode (ITO-Z_1, ITO-Z_2, ..., ITO-Z_{238}, ITO-Z_{239}) of the respective 239 it connects is the other end of $Z_{2\beta+1}$ and $Z_{2\beta}$ equipped among Z sustain electrode line (Z_1 ~ Z_{480}) of 480, and the even numbered turn G address electrode line and the second address driver (62) supplying the corresponding G/6, and B digital image data to all B address electrode line (B_1, G_2, B_2, ..., B_{639}, G_{640}, B_{640}).

68 In the meantime, as described above, as to the first address driver (61), R , and G digital image data handle. If the second address driver (62) G , and B digital image data handle, the entanglement formed between the first, and 2 address drivers (61, 62) and memory unit (30) of data transmission pattern reduces than the prior art and the noise of the display image is reduced.

69 Additionally, Y sustain drive unit (40) and Z sustain drive unit (50) are comprised of the driving IC (according to the output pin number of the driving IC, the number is changed) of the respective plurality of. The output pin of each driving IC is connected to the point-to-point mapping to Z common transparency electrode (ITO-Z_1 ~ ITO-Z_{239}) of Y common transparency electrode (ITO-Y_1 ~ ITO-Y_{240}) of 240 and 239 and the first Z_1 and final Z_{480}.

70 That is, Y sustain drive unit (40) has to secure the output pin of the driving IC with 240 . Since this is the number corresponding to the of the prior art (480 output pins), in conclusion, the driving IC number of Y sustain drive unit (40) reduces than the prior art and the saving of the manufacturing cost becomes possible.

71 Moreover, the number of driving IC than the case Z sustain drive unit (50) has to secure the output pin of the driving IC with 241, and where this makes drive independently each Z sustain electrode line in order to need the driving IC which is more than the whole Z sustain electrode line common operation time of the prior art of a number but reduce EMI are decreased.

72 That is, the number of driving IC EMI is reduced since the discharge current flow between Y sustain electrode line of each cell and Z sustain electrode line intersects and the discharge current is offset and necessary at the same time if a part commonly operates instead of altogether commonly operating and it independently operates a rests are reduced and the saving of the manufacturing cost becomes 480 Z sustain electrode lines (Z_1 ~Z_{480}) possible.

73 According to the plasma display apparatus by the embodiment of the present invention constructed as described above is addressing and display system sub-field method, if an action and effect of the invention which for example, gives the process of indicating the image of 256 (2^8) gray scale in the tri-electrode surface discharge PDP are accounted for, effect are as follows:.

74 Firstly, the MICOM (20) outputs R of 8-bit, G, and B digital image data (lowest B_1 ~ highest B_8). It digitizes R, which is input from an outside G, and B analog image data and it outputs the various kinds control signal according to R/6, G, and B digital image data and external signal.

75 At this time, digital image data outputted in the MICOM (20) is stored in the memory unit (30) as for each frame, the color sort, and a bitwise.

76 Thereafter, supply Y sustain drive unit (40) and Z sustain drive unit (50) is Y of 480 according to the control signal of the MICOM (20) and the erase pulse removing the wall charge generated to 1 step in the field of the previous in Z sustain electrode line (Y_1 ~Z_{480}), and the scan pulse for forming the equal wall charge on the whole panel into 2 step the address discharge voltage of each cell which thereafter is performed is lowered the wall charge is formed in 640 R/6, G, and each phosphor layer surface on B address electrode line (R_1 ~B_{640}) the erase pulse is supplied to the pulse, and 3 step it writes to the address period of each subfield (SF_1 ~SF_8).

77 In 4 step, since while it Y sustain electrode line (Y_1 ~Y_{480}) of 480 is successively supplied with the scan pulse, the scan pulse and polarity of Y sustain drive unit (40) are an opposite and the synchronized scan pulse is supplied to Z sustain electrode line (Z_1 ~Z_{480}) of 480 Y and Z sustain electrode line (Y_1 ~Z_{480}) of 480 are successively Han SsangSsik scanned for the address period of each subfield (SF_1 ~SF_8).

78 Additionally, in 4 step, while Y and Z sustain electrode line (Y_1 ~Z_{480}) of 480 are successively Han SsangSsik scanned, the first , and 2 address drivers (61, 62) supply corresponding address pulse (R, G, and 1 bit value of B digital image data) synchronized in R of 640, G, and B address electrode line (R_1 ~B_{640}) with the scan pulse and the address discharge occurs in the discharge space inside of each cell in which the logic high is supplied to the address pulse.

79 At this time, the first, and 2 address drivers (61, 62) supply $B_1 \rightarrow SF_1$, $B_2 \rightarrow SF_2$, ..., and $B_7 \rightarrow SF_7$, $B_8 \rightarrow SF_8$ among the digital image data (B_1 ~B_8) corresponding to each cell of 8-bit.

80 In the meantime, in the above case, it Y_{2a-1} and Y_{2a} parallely connected among 480 Y sustain electrode lines (Y_1 ~Y_{480}) is supplied with the respective same drive pulse line. It Y_2 or Y_{480} is supplied with the scan pulse in which a voltage is lower than that of the scan pulse supplied to Y_1 . Here, the scan pulse supplied to Y_1 is identical with the scan pulse supplied to M Y sustain electrode line of the prior art.

81 If this is scanned with Y_1 and Z_1 this, a discharge occurs between Y_1 and Z_1 and a discharge occurs between Y_2 and Z_1 connected in parallel with Y_1 at the same time at the same time, the wall charge is formed on the MgO protective layer on Y_1 and Y_2. If the wall charge uses the already formed wall charge even if the scan pulse of the low power is more supplied than the scan pulse supplied to Y_1 to Y_2 when as long as the erase pulse is not applied, this does not do not have and the next Y_2 and Z_2 are scanned, the scanning of Z_2 and Y_2 is possible.

82 Moreover, if Y_2 and Z_2 are scanned, a discharge occurs between Y_2 and Z_2 and a discharge occurs between Z_3 and Y_2 connected in parallel with Z_2 at the same time at the same time, the wall charge is formed on Z_2 and Z_3. Even if it Y_3 is more supplied with the scan pulse (the same scan pulse as the scan pulse supplied to that is, Y_2) of the low power than the scan pulse supplied to Y_1 when the next Y_3 and Z_3 are scanned with the wall charge, the scanning of Z_3 and Y_3 is possible.

83 Therefore, the embodiment of the present invention can run the tri-electrode surface discharge PDP (10) to the driving voltage lower than the prior art and the power consumption is saved.

84 Moreover, in the above case, the same time scanning of Y_{2a} and Y_{2a-1} runing among 480 Y sustain electrode lines (Y_1~Y_{480}) the common can be prevented with the consecutive scanning of Z sustain electrode line (Z_1~Z_{480}) of 480.

85 For example, Y_1 and Y_2 runing among 480 Y sustain electrode lines (Y_1~Y_{480}) the common are scanned with the consecutive scanning of Z_2 which is not connected to the inter parallel and Z_1 in order. It is scanned with the consecutive scanning of Z_4 which also is not connected to the inter parallel with Y_3 and Y_4 and Z_3 in order.

86 Additionally, in 240 Y common transparency electrodes (ITO-Y_1 ~ ITO-Y_{240}), since the scan pulse in which a scroll is a twice is supplied, consequently the frequency of the drive pulse line is reduced for the consecutive scanning of Y_{2a} and Y_{2a-1} connected to each than the prior art. If the address period of each subfield (SF_1~SF_8) is completed, Y and Z sustain drive units (40, 50) maintain according to the control signal of the MICOM (30) in the meantime. Supplying the first, and 2 sustainer pulse to Z sustain electrode line (Y_1~Z_{480}) and in which the first, and 2 sustainer pulse are the discharge and radiation of each cell in which the address discharge occurs supplied.

88 At this time, in each subfield (SF_1~SF_8), the sustainer pulse which is in proportion to the SF_1 : SF_2 : ... SF_7 : SF_8 = 1: 2: 4: 8: 16: 32: 64: 128 of a number is supplied.

89 The multilevel image of 1 frame is indicated on the tri-electrode surface discharge PDP (10) if the sustain period of the last subfield (SF_8) is completed after the process as described above.

90 Additionally, even if the present invention is applied to the other driving method except explained addressing and display system sub-field method, in the above case, it can obtain an effect including the scanning voltage reduction of Z sustain electrode line and Y, EMI and noise saving etc. due to the same time wall charge formation connected to the inter parallel on Y sustain electrode line.

91 Thus, in the above case, the present invention can be variously changed in the range that is not restricted to the explained embodiment but is not contrary to the gist.

Effects of the Invention

92 In this way, the plasma display apparatus has the effect that the number of part among a plurality of Y/6 of the AC PDP and Z sustain electrode line is the identical electrode line and driving IC it is connected to the adjacent electrode line to the inter parallel and it each commonly runses and driving frequency are reduced and the manufacturing cost and power consumption are saved. The scanning voltage of the sustain electrode line is reduced with the wall charge that at the same time, is formed on the sustain electrode line connected to the inter parallel and the power consumption is saved and the life is prolonged.

93 Additionally, the plasma display apparatus has the effect that the picture quality is improved since all R address electrode lines and odd-number G address electrode line, and the entanglement which is formed between the memory unit and the first, and 2 address driver because of dividing all B address electrode lines and runing of data transmission pattern and even numbered turn G address electrode line decrease among a plurality of R, G, and B address electrode line and the noise of the display image is reduced.

Scope of Claims

Claim[1] :

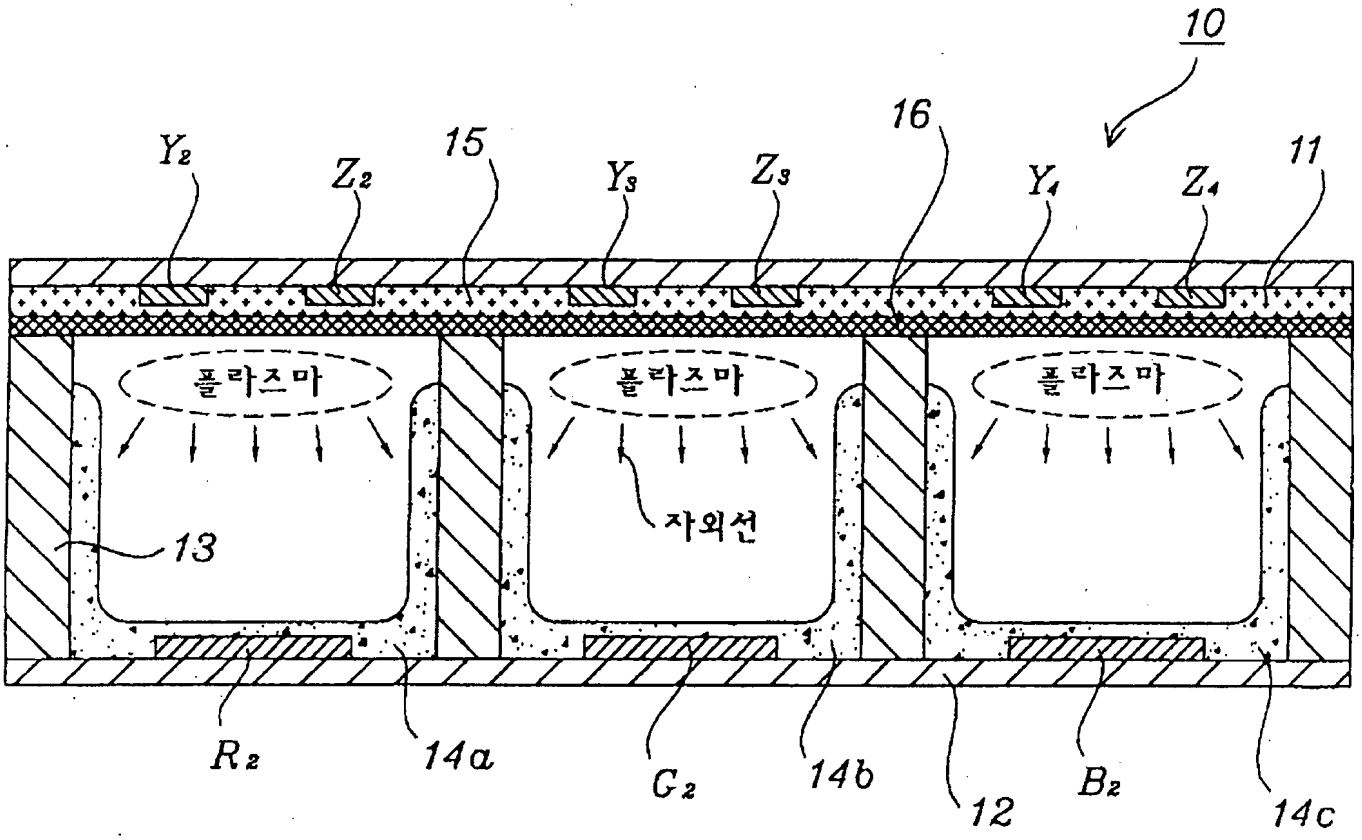
94 The plasma display apparatus wherein: it is made of Y_{2a-1} among Y of M and Z sustain electrode line and Y_{2a} (the below, A=1, 2, ..., the -1, and), altanative-current plasma display panel (it says to be below, and the AC PDP), MICOM, the memory unit, the scan pulse, supplied according to the control signal of MICOM to Y_1 more, Y_2 or Y sustain drive unit which supplies to Y_M and it successively scans Y sustain electrode line of M; and supplies the first sustainer pulse to Y sustain electrode line, Z sustain drive unit which successively scans Z sustain electrode line of M according to the control signal of MICOM and it prevents the same time scanning of Y_{2a} and Y_{2a-1} ; and supplies the second sustainer pulse to Z sustain electrode line, and the address driver; and it is comprised of Y_{2a-1} among Y of M and Z sustain electrode line and Y_{2a} (the below, A=1, 2, ..., the -1, and), altanative-current plasma display panel (it says to be below, and the AC PDP), MICOM, the memory unit, the scan pulse, supplied according to the control signal of MICOM to Y_1 more, Y_2 or Y sustain drive unit which supplies to Y_M and it successively scans Y sustain electrode line of M; and supplies the first sustainer pulse to Y sustain electrode line, Z sustain drive unit which successively scans Z sustain electrode line of M according to the control signal of MICOM and it prevents the same time scanning of Y_{2a} and Y_{2a-1} ; and supplies the second sustainer pulse to Z sustain electrode line, and the address driver; as to altanative-current plasma display panel (it says to be below, and the AC PDP), $Z_{2\beta}$ and $Z_{2\beta+1}$ (the below, β =1, 2, ..., the -2, and the -1) are parallely connected; MICOM digitizes analog image data which is input from an outside and it outputs digital image data; and outputs the various kinds control signal according to digital image data and external signal; the memory unit digital image data outputted in MICOM is stored; as to the scan pulse, supplied, a scanning is completed. The scan pulse of the low power; as to Z sustain drive unit which successively scans Z sustain electrode line of M, a scanning is completed; and as to the address driver, digital image data which Z sustain electrode line comprises of N pixel and Y scanned among Y and Z sustain electrode line of M is input from the memory unit and supplied R of N, G, and B address electrode line.

Claim[2] :

100 The plasma display apparatus of claim 1, wherein Z common transparency electrode of the respective -1 s it connects is the other end of Y common transparency electrode, of the respective the AC PDP connects and $Z_{2\beta}$ and $Z_{2\beta+1}$ one end of Y_{2a} and Y_{2a-1} equipped.

Claim[3] :

102 The plasma display apparatus of claim 1, wherein the address driver is comprised of R of N, G, all R address electrode lines among B address electrode line and odd-number G address electrode line R_1 , G_1 , R_2 , ..., the first address driver supplying corresponding digital image data to R_{N-1} , G_{N-1} , R_N , and the second address driver supplying corresponding digital image data to the even numbered turn G address electrode line and all B address electrode line B_1 , G_2 , B_2 , ...s, and B_{N-1} , G_N , B_N .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Y2
Z2
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Y3
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Y1
Z1
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플라즈마
플라즈마
플라즈마
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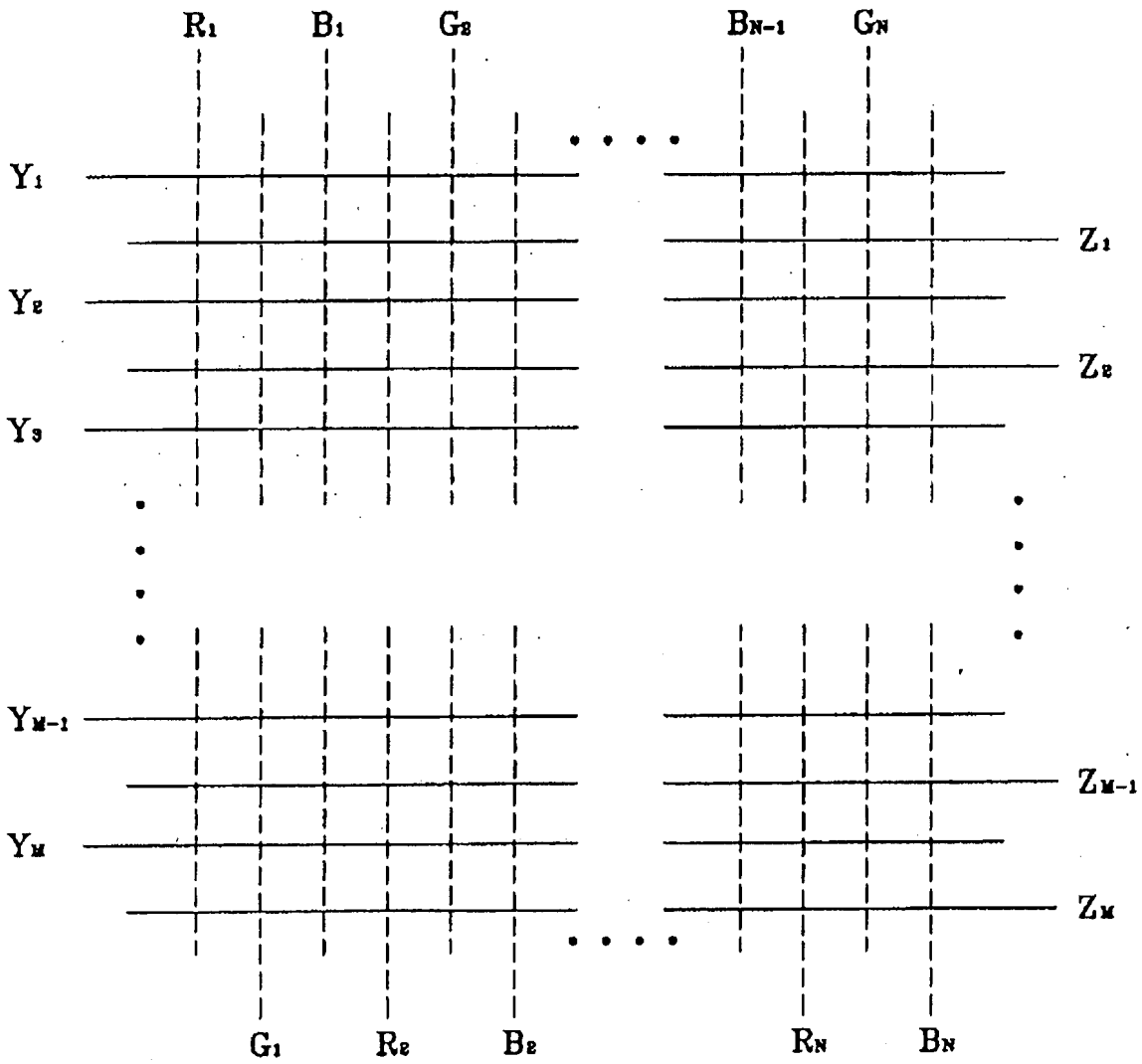
R2
14a
G2
14b
12
B2
14c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YM-1
YM
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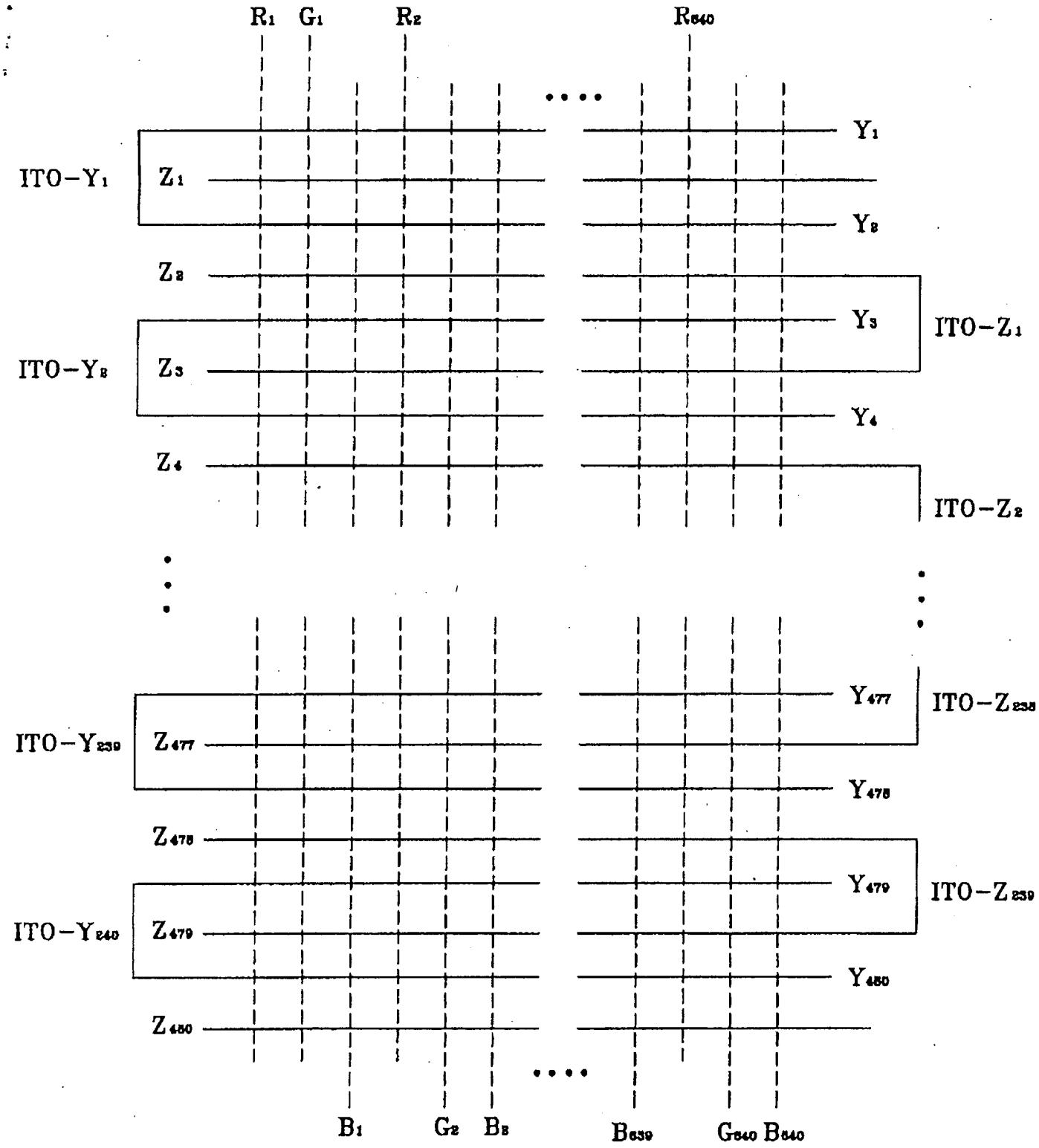
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Z1
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Y3
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Z4
ITO-Z2
Y477
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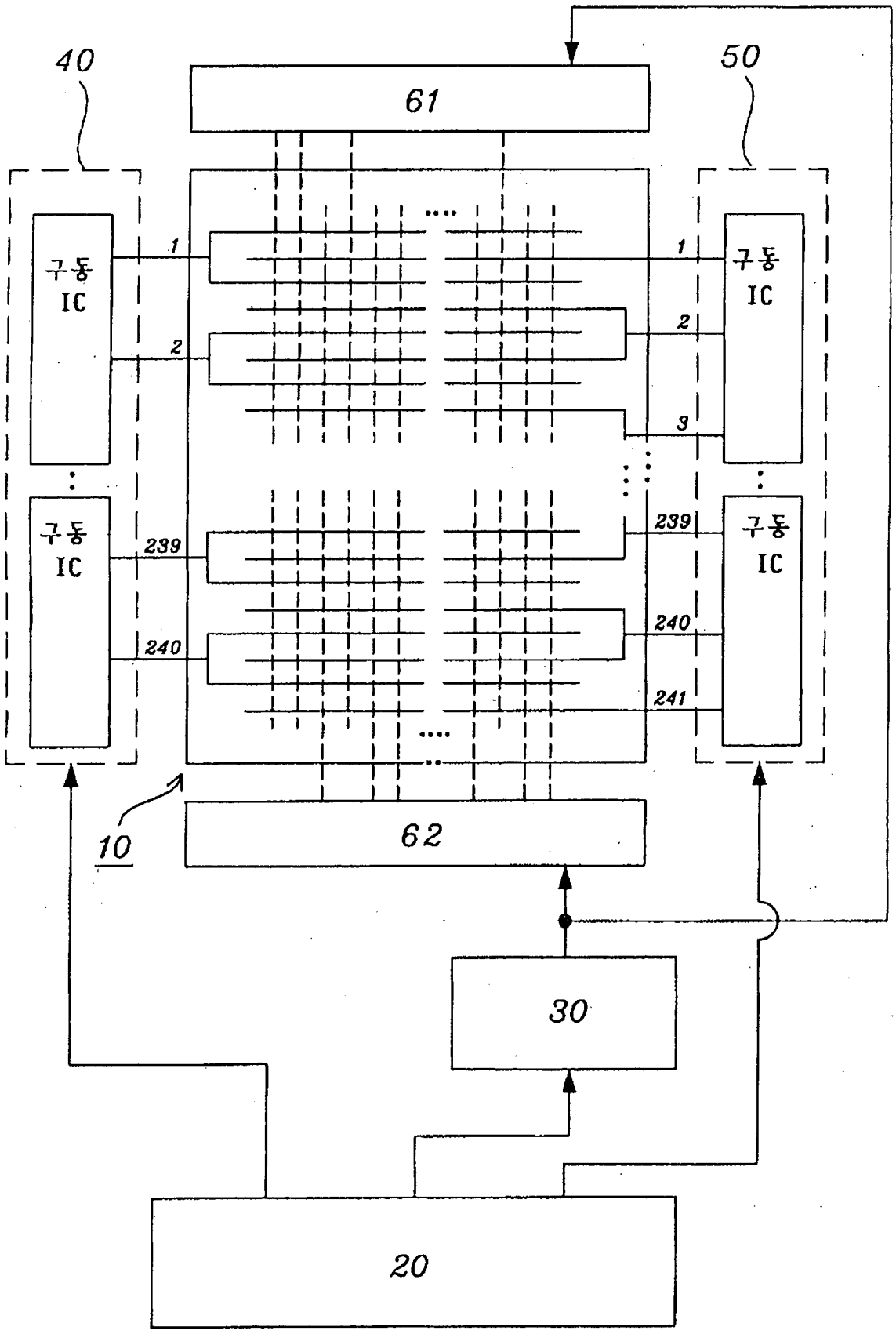
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